TG: @Chalnaayaaar

Exercise-I (Conceptual Questions) Build Up Your Understanding

GENERAL METHOD OF PREPARATION

1. Alkyl halides can be obtained by all methods excepts

(1) $CH_3—CH_2—OH + HCl \xrightarrow{ZnCl_2}$

(2) $CH_2 = CH—CH_3 + HBr \longrightarrow$

(3) $C_2H_5OH + NaCl \longrightarrow$

(4) $CH_3—CH_2—OH + NaBr \xrightarrow{H_2SO_4}$

2. Which of the following will not give iodoform test

(1) $CH_3-\underset{\underset{O}{\|}}{C}-CH_3$ (2) $C_2H_5-\underset{\underset{O}{\|}}{C}-C_2H_5$

(3) $H-CH_2-\underset{\underset{OH}{|}}{CH}-C_2H_5$ (4) $I-CH_2-\underset{\underset{O}{\|}}{C}-CH_2-H$

3. Which of the following product is obtained when bleaching powder is distilled with acetone

(1) CCl_4 (2) $CHCl_3$

(3) $CH_3—CH_3$ (4) All

4. Which will give yellow ppt. with iodine and alkali

(1) Propan–2–ol

(2) Benzophenone

(3) Methyl acetate

(4) Acetamide

PHYSICAL PROPERTIES

5. Which of the following has the highest boiling point

(1) CH_3CH_2I (2) CH_3Cl

(3) CH_3I (4) CH_3Br

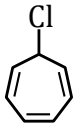
6. A compound containing two –OH groups attached with one carbon atom is unstable but which one of the following is stable

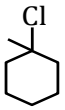
(1) $CH_3CH(OH)_2$ (2) $CH_3-\underset{\underset{OH}{|}}{\overset{\overset{OH}{|}}{C}}-OH$

(3) $Cl_3C-CH(OH)_2$ (4) All

CHEMICAL PROPERTIES

7. Arrange the following compounds in decreasing order of reactivity in S_N1 reaction:-

(a) $Ph-CH_2-Cl$ (b) 

(c)  (d) $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2-Cl$

(1) a > c > b > d (2) c > d > b > a

(3) a > b > c > d (4) b > a > c > d

8. The purity of $CHCl_3$ can be checked by

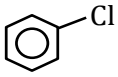
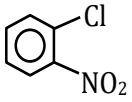
(1) Treating $CHCl_3$ by NaOH

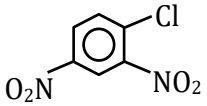
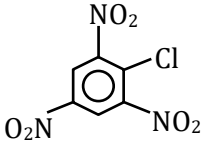
(2) Treating $CHCl_3$ by HCl

(3) Treating $CHCl_3$ with aq. $AgNO_3$

(4) Treating $CHCl_3$ by $C_2H_5–OH$

9. Which of the following undergoes hydrolysis most easily

(1)  (2) 

(3)  (4) 

10. Which of the following is used as insecticide

(1) D.D.T. (2) Chloretone

(3) $CHCl_3$ (4) All of them

11. Which reaction gives elimination as a major product

(1) $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-\overset{\ominus\oplus}{O}Na + CH_3-Br \longrightarrow$

(2) $CH_3–CH_2–Br + NaCN \xrightarrow{DMSO}$

(3) $CH_3–CH_2–Br + NaI \xrightarrow{Dry\ acetone}$

(4) $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-Br + CH_3\overset{\ominus\oplus}{O}Na \longrightarrow$

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12. When alkyl magnesium halide reacts with R'-NH_2, the product is

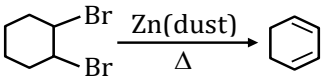
(1) R—R (2) R— H (3) R_2NH (4) R—X

13. Chloroform on reaction with acetone gives:–

(1) Acetylene (2) Chloretone

(3) Nitrochloroform (4) Chloroacetone

14. Which reaction product is wrong (major) product

(1) 

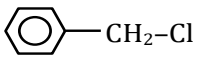
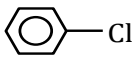
(2) $CH_3CH_2CH_2Br \xrightarrow[\text{dry Acetone}]{NaI} CH_3CH_2CH_2I$

(3) $CH_3\underset{Br}{CH}\underset{Br}{CH}CH_3 \xrightarrow[\Delta]{Zn\ (dust)} CH_3CH{=}CHCH_3$

(4) $CH_3CH_2CHCl_2 \xrightarrow[(ii)\ H^+]{(i)\ NaNH_2(excess)} CH_3C{\equiv}CH$

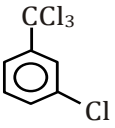
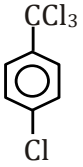
15. Which of the following undergoes nucleophilic substitution by S_N1 mechanism at fastest rate :

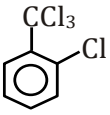
(1) $CH_3–CH_2–Cl$ (2) $CH_3\underset{CH_3}{CH}–Cl$

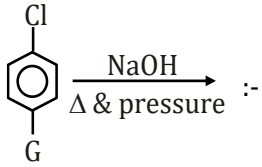
(3)  (4) 

16. $C_6H_5CCl_3 \xrightarrow[Fe]{Cl_2} X$

In the above reaction X is

(1)  (2) 

(3)  (4) None of these

17.  :-

Rate of reaction is maximum if G is :-

(1) $–OCH_3$ (2) $–CH_3$

(3) $–NO_2$ (4) –H

18. Hydrolysis of optically active 2-bromobutane gives-

(1) (d)-butan-2-ol

(2) (ℓ)-butan-2-ol

(3) (dℓ)-butan-2-ol

(4) 2- butene

19. When a haloalkane with β-hydrogen is heated with alcoholic solution of KOH the product and the type of mechanism is-

(1) Alcohol, S_N1

(2) Alkene, α-elimination

(3) Alcohol, S_N2

(4) Alkene, β-elimination

20. In RMgX, C–Mg bond is-

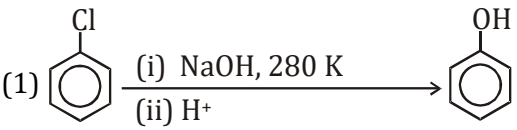
(1) Non polar covalent

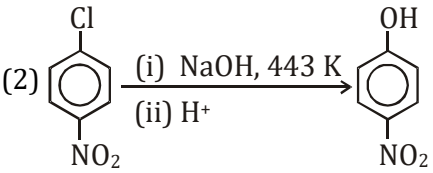
(2) Polar covalent

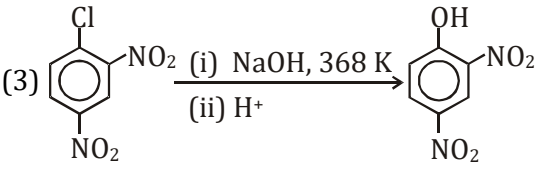
(3) Ionic

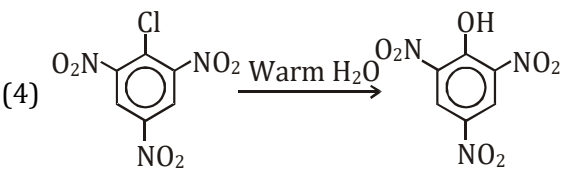
(4) Coordinate

21. The incorrect reaction is-

(1) 

(2) 

(3) 

(4) 

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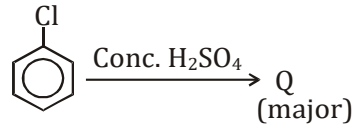
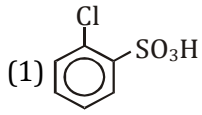
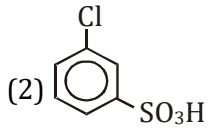
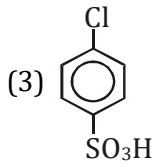
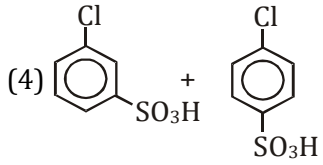
22. 

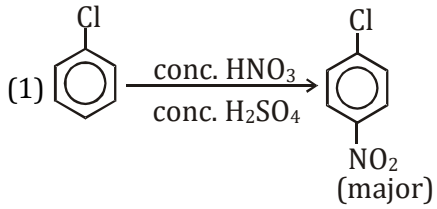
(1) 

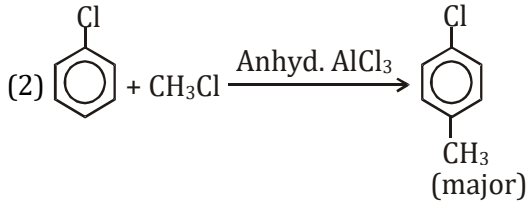
(2) 

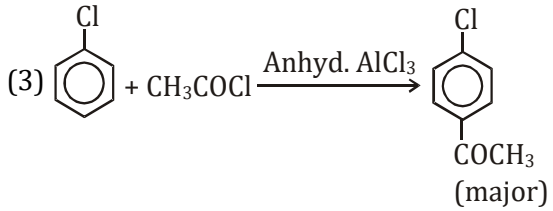
(3) 

(4) 

23. The correct reaction is -

(1) 

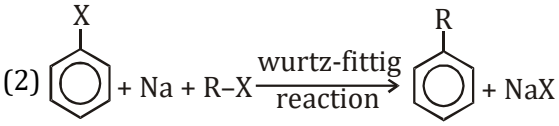
(2) 

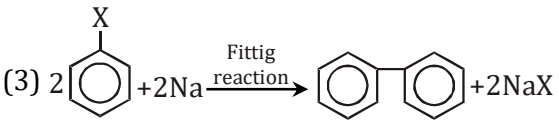
(3) 

(4) All of these

24. Which of the following is correct

(1) $2RX + 2Na \xrightarrow{\text{wurtz reaction}} R{-}R + 2NaX$

(2) 

(3) 

(4) All of these

25. Incorrect match is-

(1) Iodoform - Antiseptic

(2) Pyrene - Fire extinguisher

(3) Freon 12 - aerosol propellants

(4) DDT - Fat insoluble

EXERCISE-I (Conceptual Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	3	2	2	1	1	3	4	3	4	1	4	2	2	1	3
Question	16	17	18	19	20	21	22	23	24	25					
Answer	1	3	3	4	2	1	3	4	4	4					

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Exercise-II (Previous Year Questions) AIPMT/NEET

AIPMT 2007

1. For the following :

(a) I^- (b) Cl^- (c) Br^-

The increasing order of nucleophilicity would be :

(1) $Cl^- < Br^- < I^-$ (2) $I^- < Cl^- < Br^-$

(3) $Br^- < Cl^- < I^-$ (4) $I^- < Br^- < Cl^-$

AIPMT 2008

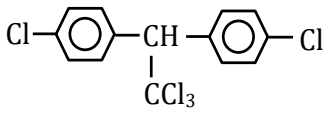
2. In a S_N2 substitution reaction of the type $R–Br + Cl^- \xrightarrow{DMF} R–Cl + Br^-$, which one of the following has the highest relative rate ?

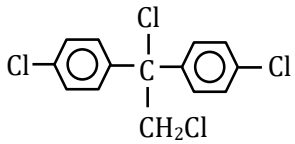
(1) $CH_3–\underset{CH_3}{\underset{|}{CH}}–CH_2Br$ (2) $CH_3–\underset{CH_3}{\overset{CH_3}{\underset{|}{\overset{|}{C}}}}–CH_2Br$

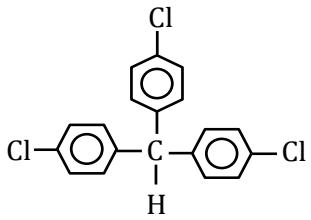
(3) $CH_3–CH_2Br$ (4) $CH_3–CH_2–CH_2Br$

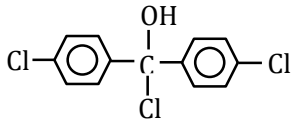
AIPMT 2009

3. Trichloroacetaldehyde, CCl_3CHO reacts with chlorobenzene in presence of sulphuric acid and produces :-

(1) 

(2) 

(3) 

(4) 

4. Which of the following reactions is an example of nucleophilic substitution reaction ?

(1) $RX + Mg \longrightarrow RMgX$

(2) $RX + KOH \longrightarrow ROH + KX$

(3) $2RX + 2Na \longrightarrow R – R + 2NaX$

(4) $RX + H_2 \longrightarrow RH + HX$

TG: @Chalnaayaaar

AIPMT 2010

5. In the following reaction

$C_6H_5CH_2Br \xrightarrow[2.H_3O^+]{1.Mg,Ether} X,$

The product 'X' is :-

(1) $C_6H_5CH_2OH$

(2) $C_6H_5CH_3$

(3) $C_6H_5CH_2CH_2C_6H_5$

(4) $C_6H_5CH_2OCH_2C_6H_5$

6. Following compounds are given :

(a) CH_3CH_2OH

(b) CH_3COCH_3

(c) $CH_3–\underset{CH_3}{\underset{|}{CHOH}}$

(d) CH_3OH

Which of the above compound(s), on being warmed with iodine solution and NaOH, will give iodoform?

(1) Only (a)

(2) (a), (b) and (c)

(3) (a) and (b)

(4) (a), (c) and (d)

7. Which one is most reactive towards S_N1 reaction?

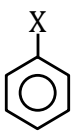
(1) $C_6H_5CH_2Br$

(2) $C_6H_5CH(C_6H_5)Br$

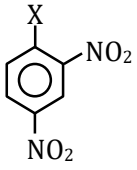
(3) $C_6H_5CH(CH_3)Br$

(4) $C_6H_5C(CH_3)(C_6H_5)Br$

8. The correct order of increasing reactivity of C–X bond towards nucleophile in the following compounds is :-



(I)



(II)

$(CH_3)_3C–X$ $(CH_3)_2CH–X$

(III) (IV)

(1) III < II < I < IV (2) I < II < IV < III

(3) II < III < I < IV (4) IV < III < I < II

TG: @Chalnaayaaar

AIPMT Pre-2011

9. Which one is a nucleophilic substitution reaction among the following ?

(1) $CH_3–CH=CH_2 + H_2O \xrightarrow{H^+} CH_3–\underset{\underset{OH}{|}}{CH}–CH_3$

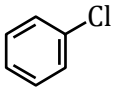
(2) $RCHO + R'MgX \longrightarrow R–\underset{\underset{OH}{|}}{CH}–R'$

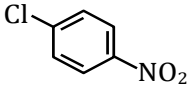
(3) $CH_3–CH_2–\underset{\underset{CH_3}{|}}{CH}–CH_2Br + NH_3 \longrightarrow CH_3–CH_2–\underset{\underset{CH_3}{|}}{CH}–CH_2NH_2$

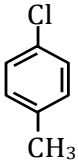
(4) $CH_3CHO + HCN \longrightarrow CH_3CH(OH)CN$

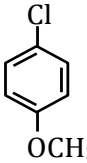
AIPMT Mains-2011

10. Which of the following compounds undergoes nucleophilic substitution reaction most easily ?

(1) 

(2) 

(3) 

(4) 

AIPMT Mains 2012

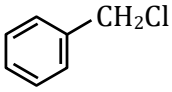
11. Which of the following compounds will give a yellow precipitate with iodine and alkali ?

(1) Acetamide (2) Propan-1-ol

(3) Acetophenone (4) Methyl acetate

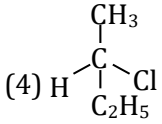
AIPMT 2014

12. Which of the following compounds will undergo racemisation when hydrolysed by solution of KOH

(1) 

(2) $CH_3CH_2CH_2Cl$

(3) $H_3C–\underset{\underset{CH_3}{|}}{CH}–CH_2Cl$

(4) 

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13. Identify Z in the sequence of reactions:

$CH_3CH_2CH=CH_2 \xrightarrow{HBr/H_2O_2} Y \xrightarrow{C_2H_5ONa} Z$

(1) $CH_3–(CH_2)_3–O–CH_2CH_3$

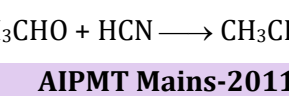
(2) $(CH_3)_2CH_2–O–CH_2CH_3$

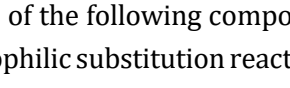
(3) $CH_3(CH_2)_4–O–CH_3$

(4) $CH_3CH_2–CH(CH_3)–O–CH_2CH_3$

AIPMT 2015

14. Which of the following is the most **correct** electron displacement for a nucleophilic reaction to take place?

(1) 

(2) 

(3)

(4)

15. In an S_N1 reaction on chiral centres, there is :

(1) 100% retention

(2) 100% inversion

(3) 100% racemization

(4) Inversion more than retention leading to partial racemization

16. Which of the following reaction(s) can be used for the preparation of alkyl halides ?

(I) $CH_3CH_2OH + HCl \xrightarrow{anhy.ZnCl_2}$

(II) $CH_3CH_2OH + HCl \longrightarrow$

(III) $(CH_3)_3COH + HCl \longrightarrow$

(IV) $(CH_3)_2CHOH + HCl \xrightarrow{anhy.ZnCl_2}$

(1) (IV) only

(2) (III) and (IV) only

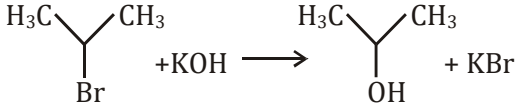
(3) (I), (III) and (IV) only

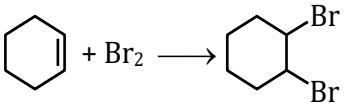
(4) (I) and (II) only

NEET-II 2016

17. For the following reactions :-

(a) $CH_3CH_2CH_2Br + KOH \rightarrow CH_3CH{=}CH_2 + KBr + H_2O$

(b) 

(c) 

Which of the following statement is **correct** ?

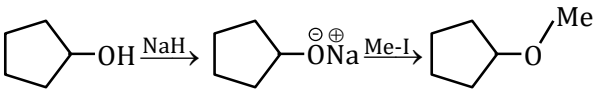
(1) (a) and (b) are elimination reaction and (c) is addition reaction

(2) (a) is elimination, (b) is substitution and (c) is addition reaction

(3) (a) is elimination, (b) and (c) are substitution reactions

(4) (a) is substitution, (b) and (c) are addition reaction

18. The reaction



Can be classified as :-

(1) Williamson ether synthesis reaction

(2) Alcohol formation reaction

(3) Dehydration reaction

(4) Williamson alcohol synthesis reaction

19. Consider the reaction

$CH_3CH_2CH_2Br + NaCN \rightarrow CH_3CH_2CH_2CN + NaBr$

This reaction will be the fastest in

(1) N, N'-dimethylformamide (DMF)

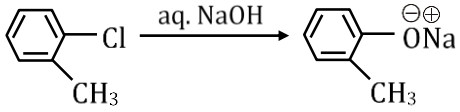
(2) Water

(3) Ethanol

(4) Methanol

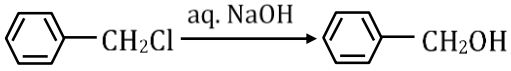
NEET(UG) 2019 (ODISHA)

20. The hydrolysis reaction that takes place at the slowest rate, among the following is :-

(1) 

(2) $H_3C{-}CH_2{-}Cl \xrightarrow{\text{aq. NaOH}} H_3C{-}CH_2{-}OH$

(3) $H_2C{=}CH{-}CH_2Cl \xrightarrow[\text{NaOH}]{\text{aq.}} H_2C{=}CH{-}CH_2OH$

(4) 

NEET(UG) 2020

21. Elimination reaction of 2-Bromopentane to form pent-2-ene is:

(a) β-Elimination reaction

(b) Follow Zaitsev rule

(c) Dehydrohalogenation reaction

(d) Dehydration reaction

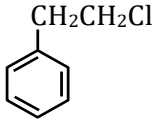
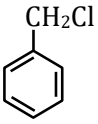
(1) (a), (b), (d) (2) (a), (b), (c)

(3) (a), (c), (d) (4) (b), (c), (d)

NEET(UG) 2020 (Covid-19)

22. Which of the following will **NOT** undergo S_N1 reaction with $\bar{O}H$?

(1) $CH_2 = CH - CH_2Cl$ (2) $(CH_3)_3\,CCl$

(3)  (4) 

NEET(UG) 2021

23. The correct sequence of bond enthalpy of 'C-X' bond is

(1) $CH_3{-}F < CH_3{-}Cl < CH_3{-}Br < CH_3{-}I$

(2) $CH_3{-}F > CH_3{-}Cl > CH_3{-}Br > CH_3{-}I$

(3) $CH_3{-}F < CH_3{-}Cl > CH_3{-}Br > CH_3{-}I$

(4) $CH_3{-}Cl > CH_3{-}F > CH_3{-}Br > CH_3{-}I$

EXERCISE-II (Previous Year Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	1	3	1	2	2	2	4	2	3	2	3	4	1	2	4
Question	16	17	18	19	20	21	22	23							
Answer	3	2	1	1	1	2	3	2							

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Exercise-III (Analytical Questions) Master Your Understanding

1. Which of the following has highest dipole moment:

(1) CH_3Cl (2) CH_3F (3) CH_3Br (4) CH_3I

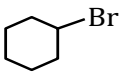
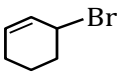
2. The final product in the reaction is

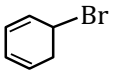
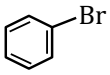
$Ph—OH + CCl_4 \xrightarrow[(2)\ H^{\oplus}]{(1)\ KOH,\Delta}$ product

(1) Salicylaldehyde (2) Salicylic acid

(3) Methyl salicylate (4) Benzyl chloride

3. Arrange the following in order of ease of dehydrohalogenation:

(i)  (ii) 

(iii)  (iv) 

(1) (iii) > (iv) > (ii) > (i)

(2) (iii) > (ii) > (i) > (iv)

(3) (ii) > (iii) > (i) > (iv)

(4) (i) > (ii) > (iii) > (iv)

4. The product in the following reaction is

$Ph—Cl + Fe / Br_2 \longrightarrow$ Product

(1) o–bromo chloro benzene

(2) p–bromo chloro benzene

(3) Both the above

(4) 2,4,6–tribromo chloro benzene

5. Isobutyl magnesium bromide with dry ether and absolute alcohol gives

(1) $CH_3–\underset{\displaystyle CH_3}{\underset{|}{CH}}–CH_2OH$ and CH_3CH_2MgBr

(2) $CH_3–\underset{\displaystyle CH_3}{\underset{|}{CH}}–CH_2–CH_2–CH_3$ and Mg (OH) Br

(3) $CH_3–\underset{\displaystyle CH_3}{\underset{|}{CH}}–CH_3$, $CH_2=CH_2$ and Mg(OH)Br

(4) $CH_3–\underset{\displaystyle CH_3}{\underset{|}{CH}}–CH_3$ and CH_3CH_2OMgBr

6. Identify 'Z' in the following reaction series,

$CH_3.CH_2CH_2Br \xrightarrow{aq.NaOH}$ (X) $\xrightarrow[Heat]{Al_2O_3}$ (Y) $\xrightarrow{Cl_2/H_2O}$ (Z)

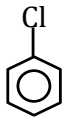
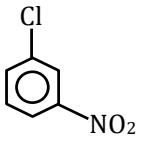
(1) Mixture of $CH_3–\underset{\displaystyle Cl}{\underset{|}{CH}}–\underset{\displaystyle Cl}{\underset{|}{CH_2}}$ and $CH_3–\underset{\displaystyle OH}{\underset{|}{CH}}–\underset{\displaystyle OH}{\underset{|}{CH_2}}$

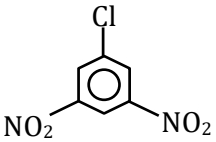
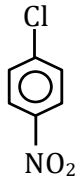
(2) $CH_3–\underset{\displaystyle OH}{\underset{|}{CH}}–\underset{\displaystyle Cl}{\underset{|}{CH_2}}$

(3) $CH_3–\underset{\displaystyle Cl}{\underset{|}{CH}}–\underset{\displaystyle OH}{\underset{|}{CH_2}}$

(4) $CH_3–\underset{\displaystyle Cl}{\underset{|}{CH}}–\underset{\displaystyle Cl}{\underset{|}{CH_2}}$

7. Arrange the following compound in increasing order of reactivity towards aromatic nucleophilic substitution reaction.

(a)  (b) 

(c)  (d) 

(1) c > d > b > a (2) c > b > a > d

(3) d > c > b > a (4) a > d > b > c

8. Chloroform when treated with benzene in presence of anhydrous $AlCl_3$, the product formed is

(1) Chlorobenzene

(2) Toulene

(3) Mixture of ortho and para chlorotoluene

(4) Triphenyl methane

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9. Consider the following statements-
(A) In allylic halides halogen atom is bonded to an sp^3 carbon adjacent to C=C
(B) In benzylic halides halogen atom is bonded to sp^3 carbon attached to an aromatic ring
(C) In vinylic halides halogen atom is bonded to a sp^2 carbon of a C=C
(D) In aryl halides halogen atom is directly bonded to a sp^2 carbon of an aromatic ring
Which statement(s) is/are correct
(1) Only A, B, C (2) Only A, C
(3) Only A, C, D (4) All

10. Which alkane gives 1-chloro-2,2-dimethyl propane on monochlorination-
(1) Isopentane
(2) Isobutane
(3) Neopentane
(4) 2,3-dimethyl butane

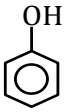
11. $CH_3-CH_2-OH \xrightarrow[H_2SO_4]{NaBr} (A) \xrightarrow[\Delta]{Alc.KOH} (B) \xrightarrow{HBr} (C)$
A, B and C are respectively -
(1) $CH_3CH_2HSO_4$, $CH_2=CH_2$, $BrCH_2-CH_2-Br$
(2) CH_3-CH_2-Br, $CH_2=CH_2$, CH_3-CH_2-Br
(3) $CH_3-CH_2-OCH_2-CH_3$, $CH_2=CH_2$, $CH_3-\underset{\displaystyle Br}{\underset{|}{CH_2}}$
(4) $CH_2=CH_2$, CH_3-CH_2-OH, CH_3-CH_2-Br

12. Correct order of rate of photo bromination for following compounds-
(I) CH_3-CH_3 (II) CD_3-CD_3
(III) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}}-H$
(1) II < I < III (2) I < II < III
(3) III < I < II (4) II < III < I

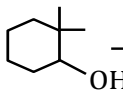
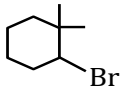
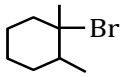
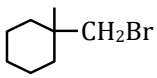
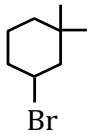
13. $\xrightarrow[h\nu]{Cl_2}$ Monochlorination product
Number of possible monochloro derivatives excluding stereo isomers is/are -
(1) 4 (2) 5 (3) 3 (4) 6

14. Which halide ion is the best nucleophile in DMF -
(1) $F^{\ominus}$ (2) $Cl^{\ominus}$ (3) $Br^{\ominus}$ (4) $I^{\ominus}$

15. Which of the following S_N2 reaction is the slowest-
(1) $CH_3-CH_2-CH_2-Br \xrightarrow{\overset{\ominus}{OH}} CH_3-CH_2-CH_2-OH + Br^-$
(2) $CH_3-CH_2-CH_2-Cl \xrightarrow{\overset{\ominus}{OH}} CH_3-CH_2-CH_2-OH + Cl^-$
(3) $CH_3-CH_2-CH_2-F \xrightarrow{\overset{\ominus}{OH}} CH_3-CH_2-CH_2-OH + F^-$
(4) $CH_3-\underset{\displaystyle F}{\underset{|}{CH}}-CH_3 \xrightarrow{\overset{\ominus}{OH}} CH_3-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_3 + F^-$

16. Rate of S_N2 reaction will be maximum in which of the following solvent -
(1) H_2O (2) CH_3OH
(3)  (4) DMSO

17. Best method to convert alcohol into alkyl chloride is -
(1) $ROH + SOCl_2 \longrightarrow R-Cl + SO_2 + HCl$
(2) $R-OH + PCl_3 \longrightarrow R-Cl$
(3) $R-OH + PCl_5 \longrightarrow R-Cl$
(4) $R-OH + HCl \longrightarrow R-Cl + H_2O$

18.  $\xrightarrow{HBr}$ Major product ?
(1) 
(2) 
(3) 
(4) 

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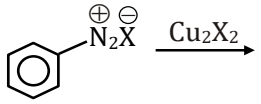
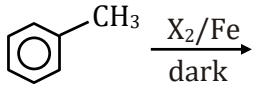
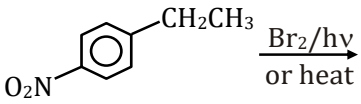
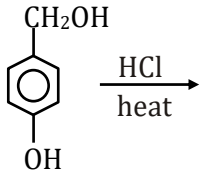
19. Identify incorrect match in the following -

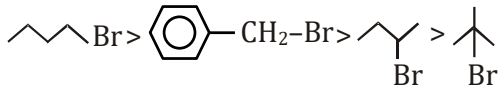
(1)  ESR

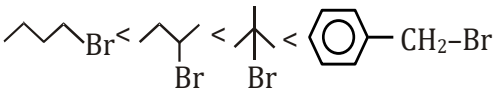
(2)  ESR

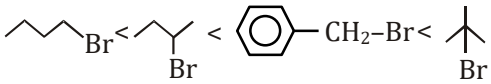
(3)  FRSR

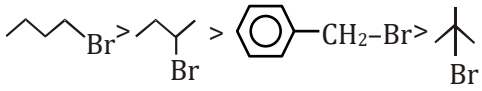
(4)  NSR

20. The correct reactivity order for S_N1 reactions is-

(1) 

(2) 

(3) 

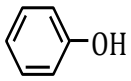
(4) 

21. Which of the following is most reactive for S_N2 reactions.

(1) $(C_6H_5)_2C(CH_3)Br$ (2) $C_6H_5CH(CH_3)Br$

(3) $(C_6H_5)_3CBr$ (4) $C_6H_5CH_2Br$

22. The correct reactivity order towards H–X will be

(I)  (II) $CH_2=CH-CH_2OH$

(III) CH_3-CH_2-OH (IV) $CH_3-\underset{\underset{OH}{|}}{CH}-CH_3$

(1) II > I > III > IV (2) IV > III > II > I

(3) II > IV > I > III (4) II > IV > III > I

23. Which of the following product will be obtained when neopentyl alcohol is treated with conc. HCl in presence of $ZnCl_2$.

(1) t– butyl chloride

(2) Isobutylene

(3) t– pentyl chloride

(4) Neo pentyl chloride

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24. In S_N1 the first step involves the formation of

(1) Free radical (2) Carbanion

(3) Carbocation (4) Final product

25. To form alkane isonitrile, alkyl halide is reacted with:

(1) KCN (2) AgCN

(3) NaCN (4) NH_4CN

26. Alkyl fluorides are synthesised by

(1) Finkelstein reaction (2) Swart reaction

(3) Kolbe reaction (4) Wurtz reaction

27. The products of reaction of alcoholic silver nitrite with ethyl bromide are

(1) Ethane (2) Ethene

(3) Ethyl alcohol (4) Nitro ethane

28. For the reaction,

$C_2H_5OH + HX \longrightarrow C_2H_5X$, the order of reactivity is

(1) HI > HCl > HBr (2) HI > HBr > HCl

(3) HCl > HBr > HI (4) HBr > HI > HCl

29. The reaction, $CH_3Br + OH^- \longrightarrow CH_3OH + Br^-$ obeys the mechanism

(1) S_N1 (2) S_N2 (3) E_1 (4) E_2

30. Butanenitrile may be prepared by heating

(1) Propyl alcohol with KCN

(2) Butyl alcohol with KCN

(3) Butyl chloride with KCN

(4) Propyl chloride with KCN

31. The given reaction is an example of

$C_2H_5Br + KCN(aq.) \longrightarrow C_2H_5CN + KBr$

(1) Elimination

(2) Nucleophilic substitution

(3) Electrophilic substitution

(4) Redox change

32. An alkyl halide may be converted into an alcohol by

(1) Addition

(2) Substitution

(3) Dehydrohalogenation

(4) Elimination

33. Compound is most reactive towards NaOH in

(1) CH_3Cl (2) $CH_2=CHCl$

(3) C_6H_5Cl (4) $C_6H_5CH_2Cl$

34. Most stable carbocation formed from $(CH_3)_3C–Br$, $(C_6H_5)_3CBr$, $(C_6H_5)_2CHBr$ and $C_6H_5CH_2Br$ would be

(1) $C_6H_5\overset{\oplus}{C}H_2$ (2) $(CH_3)_3\overset{\oplus}{C}$

(3) $(C_6H_5)_3\overset{\oplus}{C}$ (4) $(C_6H_5)_2\overset{\oplus}{C}H$

35. S_N1 reaction on an optically active substrate having only one chiral centre which is also reaction centre, gives :-

(1) Retention in configuration
(2) Inversion in configuration
(3) Partially racemised product
(4) Complete racemised product

36. The hydrolysis of alkyl halides by aqueous NaOH is best termed as

(1) Electrophilic substitution reaction
(2) Electrophilic addition reaction
(3) Nucleophilic addition reaction
(4) Nucleophilic substitution reaction

37. Reaction of sodium ethoxide and ethyl iodide will give :-

(1) Ether (2) Ethyl alcohol
(3) Acetaldehyde (4) Acetic acid

38. The least reactive chlorine is present in

(1) Methyl chloride (2) Allyl chloride
(3) Ethyl chloride (4) Vinyl chloride

39. Arrange the following compounds in the increasing order of their S_N2 reactivity?

$CH_3–\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}–X$, $CH_3–\underset{\underset{CH_3}{|}}{CH}–X$, $CH_3–CH_2–X$, $CH_3–X$

(a) (b) (c) (d)

(1) (a) < (b) < (c) < (d)
(2) (a) < (c) < (d) < (b)
(3) (d) < (c) < (b) < (a)
(4) (b) < (d) < (c) < (a)

40. Which alcohol produces turbidity with Lucas reagent most slowly

(1) 2–Butanol
(2) t–Butyl alcohol
(3) Isobutyl alcohol
(4) Diphenyl methanol

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41. The reaction of ethyl iodide with sodium ethoxide is

(1) An electrophilic substitution reaction
(2) A nucleophilic addition reaction
(3) A nucleophilic substitution reaction
(4) A free radical substitution reaction

42. The Williamson synthesis involves :-

(1) A nucleophilic addition
(2) An electrophilic substitution
(3) S_N2 displacement
(4) S_N1 displacement

43. In the Williamson synthesis of ethers given by the general equation –

$R–X + R'ONa \longrightarrow R–O–R'$ the yield from R–X follows the sequence :-

(1) $CH_3X > 1° > 2° > 3°$
(2) $CH_3X < 1° < 2° < 3°$
(3) $CH_3X < 1° < 2° > 3°$
(4) $CH_3X > 1° < 2° < 3°$

44. With conc. HBr ethyl phenyl ether yields :–

(1) Phenol and ethyl bromide.
(2) Bromobenzene and ethanol
(3) Phenol and ethane
(4) Bromobenzene and ethane

ELIMINATION REACTION

45. The reactivity of alkyl halides in E_2 elimination reactions follows the order

(1) R–I < R–Br < R–Cl < R–F
(2) R–F < R–Cl < R–Br < R–I
(3) R–I > R–Cl > R–Br < R–F
(4) R–I < R–Br < R–F < R–Cl

46. The unimolecular elimination involves formation of

(1) A free radical (2) A carbanion
(3) A carbocation (4) A biradical

47. Which of the following alkyl halides gives a mixture of alkenes on dehydrohalogenation

(1) n–Propyl halide
(2) Isopropyl halide
(3) s–Butyl bromide
(4) t–Butyl bromide

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48. Arrange the following alkanols A, B and C in order of their reactivity towards acid catalysed dehydration:-

(A) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2-CH_2-OH$

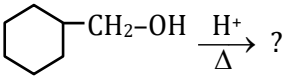
(B) $CH_3-\overset{\displaystyle OH}{\overset{|}{\underset{\displaystyle CH_3}{\underset{|}{C}}}}-CH_2-CH_3$

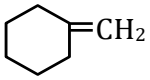
(C) $CH_3-\overset{\displaystyle CH_3}{\overset{|}{CH}}-\overset{\displaystyle OH}{\overset{|}{CH}}-CH_3$

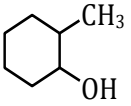
(1) A > B > C (2) B > A > C

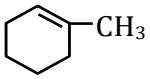
(3) B > C > A (4) C > B > A

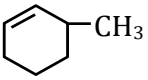
49. The major product in the following reaction is



(1) 

(2) 

(3) 

(4) 

50. Arrange the following alkyl halides in decreasing order of the rate of elimination reaction with alcoholic KOH.

(A) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle H}{\overset{|}{\underset{|}{C}}}}-CH_2-Br$ (B) CH_3-CH_2-Br

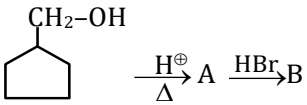
(C) $CH_3-CH_2-CH_2-Br$

(1) A > B > C

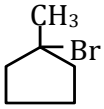
(2) C > B > A

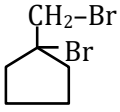
(3) B > C > A

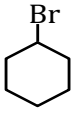
(4) A > C > B

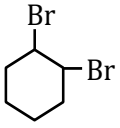
51. 

What is the structure of B :-

(1) 

(2) 

(3) 

(4) 

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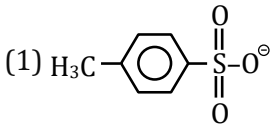
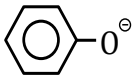
52. Which of the following has maximum nucleophilicity :-

(1) 

(2) $CH_3-O^{\ominus}$

(3) $CF_3-\underset{\displaystyle O}{\underset{\|}{C}}-O^{\ominus}$

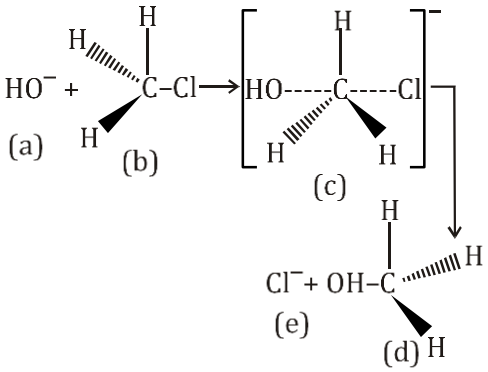
(4) 

53. Alkaline hydrolysis of 2,2-Dichloropropane gives

(1) Acetone (2) 2,2-Propanediol

(3) Propane (4) Propan-2-ol

54. Which of the following statement is correct for S_N2 mechanism



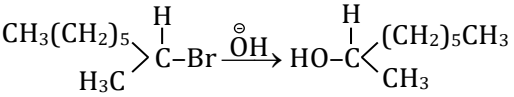
(1) In (c) carbon atom is sp^3 hybridized

(2) In (c) carbon atom is sp^2 hybridised

(3) (a) and (e) are electrophiles

(4) (c) is more stable then (d)

55. Following reaction is



(1) E_1 (2) S_N1 (3) E_2 (4) S_N2

56. $\overset{\displaystyle 3}{\overset{|}{CH_3}}-\overset{\displaystyle 2}{\overset{|}{CH}}-\overset{\displaystyle 1}{\overset{|}{CH_2}}Cl \xrightarrow{\text{aq. KOH}} CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2-OH$

In the above reaction the attack of a nucleophile would be from which side

(1) On the front side of Cl of C_1 carbon

(2) On C_2 carbon

(3) On the rear side of Cl of C_1 carbon

(4) On C_3 carbon

57. Which of the following ether can not be prepared by Williamson's method :-
(1) Ditert.butyl ether
(2) Methyltert.butyl ether
(3) Anisole
(4) 1 & 2 Both

58. Major product of the reaction :-
$(CH_3)_3C-Cl + C_2H_5ONa \longrightarrow$ would be :-
(1) $(CH_3)_2C-OC_2H_5$
(2) $(CH_3)_3C-C_2H_5$
(3) $(CH_3)_2C=CH_2$
(4) $CH_3-CH=CH-C_2H_5$

59. In following two columns :

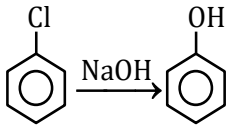
Column-I

(a) $CH_3-CH_2-Br + HS^- \rightarrow CH_3-CH_2-SH + Br^-$

(b) $(CH_3)_2C=CH_2 + HOCl \rightarrow (CH_3)_2\overset{OH}{\overset{|}{C}}-CH_2-Cl$

(c) $CH_3-CH_2-Br + {}^-OH \rightarrow CH_2=CH_2+H_2O + Br^-$

(d) $(CH_3)_3C-CH_2-OH + H-Br \rightarrow (CH_3)_2CBrCH_2-CH_3 + H_2O$

(e) 

Column-II

(1) Nucleophilic substitution
(2) Elimination
(3) Electrophilic substitution
(4) Electrophilic addition
(5) Rearrangement reaction

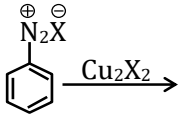
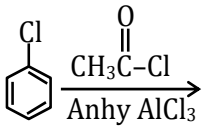
(1) a, d, e → 1, b → 4, c → 2
(2) a, d, e → 1, b → 4, c → 3
(3) a, e → 1, b → 4, c → 2, d → 5
(4) a, c → 1, b → 4, e → 3, d → 5

60. Match the column :-

Column-I (Conversion)		Column-II (Reagent)	
(a)	1–Butene→ 2–Butanol	(p)	BH_3/THF, CH_3COOH
(b)	1–Butene → 1–Butanol	(q)	HBr, aq KOH
(c)	Propene → Propane	(r)	Alc.KOH, HBr/R_2O_2
(d)	2–Bromopropane →1–Bromo propane	(s)	HBr/H_2O_2, aq KOH

(1) a – q, b – p, c – s, d – r
(2) a – p, b – s, c – q, d – r
(3) a – q, b – r, c – s, d – p
(4) a – q, b – s, c – p, d – r

61. Match the column :-

Column-I (Reaction)		Column-II (Reaction name)	
(a)	$CH_3CH_2-Cl \xrightarrow[\text{Dry Acetone}]{NaI}$	(p)	Friedel craft reaction
(b)		(q)	Finkelstein reaction
(c)	$CH_3-Br+AgF\rightarrow$	(r)	Sandmeyer's reaction
(d)		(s)	Swart's Reaction

(1) a – p, b – r, c – s, d – q
(2) a – q, b – r, c – s, d – p
(3) a – r, b – s, c – p, d – q
(4) a – s, b – r, c – q, d – p

62. Match the column :-

Column-I (compounds)		Column-II (Uses)	
(a)	Triiodomethane	(p)	Fire Extinguisher
(b)	Tetra chloromethane	(q)	Antiseptic
(c)	Chlorofluoro carbon	(r)	Insecticide
(d)	p,p'-Dichloro diphenyl trichloroethane	(s)	Aerosol propellants

(1) a – p, b – r, c – s, d – q
(2) a – q, b – p, c – s, d – r
(3) a – q, b – s, c – r, d – p
(4) a – s, b – r, c – q, d – p

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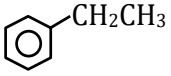
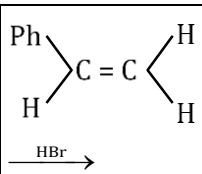
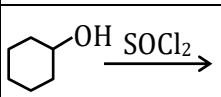
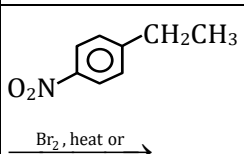
63. Match the column :-

Column-I (Reaction)		Column-II (Product)	
(a)	$CH_3CH_2Br \xrightarrow[\text{dry Ether}]{Mg}$	(p)	CH_3CH_2-H
(b)	$CH_3CH_2-Br \xrightarrow{Zn-Cu/C_2H_5OH}$	(q)	Ph–Ph
(c)	$CH_3CH_2Br+PhBr \xrightarrow[\text{Dry Ether}]{Na}$	(r)	CH_3CH_2MgBr
(d)	$2PhBr \xrightarrow[\text{Dry Ether}]{Na}$	(s)	

(1) a – r, b – s, c – p, d – q
(2) a – r, b – p, c – s, d – q
(3) a – s, b – r, c – p, d – q
(4) a – q, b – s, c – r, d – p

64. Match the column-I & column-II :-

Column-I (Reaction)		Column-II (Type of reaction)	
(a)		(p)	Free radical substitution reaction
(b)	$Ph-CH_2-CH=CH_2 \xrightarrow[R_2O_2]{HBr}$	(q)	Nucleophilic substitution reaction
(c)		(r)	Free radical addition reaction
(d)		(s)	Electrophilic addition reaction

(1) a – q, b – r, c – s, d – p
(2) a – s, b – q, c – p, d – r
(3) a – r, b – s, c – q, d – p
(4) a – s, b – r, c – q, d – p

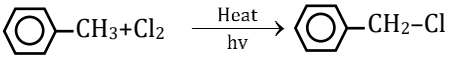
65. Match the column :-

Column-I (Carbon Halogen bond)		Column-II (Bond length)	
(a)	CH_3-F	(p)	214 pm
(b)	CH_3-Cl	(q)	193 pm
(c)	CH_3-Br	(r)	178 pm
(d)	CH_3I	(s)	139 pm

(1) a – r, b – s, c – p, d – q
(2) a – r, b – p, c – q, d – s
(3) a – s, b – p, c – r, d – q
(4) a – s, b – r, c – q, d – p

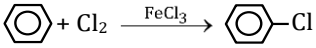
66. Which of the following gives cyanide when reacted with KCN
(A) Chloro benzene
(B) Allyl bromide
(C) Vinyl chloride
(D) Benzyl bromide
(1) A, B and C
(2) A and B
(3) B and D
(4) A and C

67. Which of the following reactions take place via carbon free radicals as intermediates :

(A) 

(B) $CH_3-CH=CH_2+HBr \xrightarrow{H_2O_2} CH_3CH_2CH_2Br$

(C) $CH_3-CH=CH_2+HBr \rightarrow CH_3-\underset{\underset{Br}{|}}{CH}-CH_3$

(D) 

(1) A, B and C
(2) A and B
(3) B and D
(4) A and C

68. Given below are two statements:
Statement-I : 2-Bromo pentane on reaction with alcoholic KOH gives 1-pentene as a major product.
Statement-II : In dehydrohalogenation reactions the preferred product is always that alkene which has lesser number of alkyl groups attached to the doubly bonded c-atoms.
In the light of the above statements, choose the most appropriate answer from the options given below:
(1) Both statements-I and II are correct.
(2) Statement-I is correct but Statement-II is incorrect.
(3) Both Statement-I and II are incorrect
(4) Statement-I is incorrect but Statement-II is correct.

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69. Given below are two statements:

Statement-I : Boiling point of isomeric dihalo benzenes are very nearly the same, However, the para isomers has high melting point as compared to their ortho and meta isomers.

Statement-II : It is due to symmetry of ortho isomers that fits in crystal lattice better as compared to para and meta-isomers.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statements-I and II are correct.
(2) Both Statement-I and II are incorrect
(3) Statement-I is correct but Statement-II is incorrect.
(4) Statement-I is incorrect but Statement-II is correct.

70. Given below are two statements:

Statement-I : Compound which are Non superimposable on their mirror images are called chiral & property is knows as chirality.

Statement-II : All compounds which are superimposable mirror images of each other are called meso compounds.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement-I is correct but Statement-II is incorrect.
(2) Both statements-I and II are correct.
(3) Both Statement-I and II are incorrect
(4) Statement-I is incorrect but Statement-II is correct.

71. Given below are two statements:

Statement-I : Solubility of halo alkanes in water is low. However halo alkane tend to dissolve in organic solvents.

Statement-II : The new intermolecular attractions between halo alkanes & solvent molecules have different strength as the ones being broken in separate halo alkanes & solvent molecules.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statements-I and II are correct.
(2) Statement-I is correct but Statement-II is incorrect.
(3) Both Statement-I and II are incorrect
(4) Statement-I is incorrect but Statement-II is correct.

72. Given below are two statements:

Statement-I : Alkyl iodides are often prepared by the reaction of alkyl chlorides/bromides with NaI in dry acetone. NaCl or NaBr formed is precipitated in dry acetone. It facilitates the reverse reaction according to le-chatelier's principle.

Statement-II : The synthesis of alkyl flourides is best accomplished by heating an alkyl chloride/ bromide in presence of metallic fluoride such as AgF, Hg_2F_2, CoF_2 or SbF_3.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement-I is correct but Statement-II is incorrect.
(2) Both statements-I and II are correct.
(3) Both Statement-I and II are incorrect
(4) Statement-I is incorrect but Statement-II is correct.

73. Given below are two statements:

Statement-I : Aryl chlorides & bromides can be easily prepared by ESR of Arenes with Cl_2 & Br_2 respectively in the presence of lewis acid catalyst.

Statement-II : Reactions with I_2 are reversible

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement-I is correct but Statement-II is incorrect.
(2) Statement-I is incorrect but Statement-II is correct.
(3) Both Statement-I and II are incorrect
(4) Both statements-I and II are correct.

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74. Given below are two statements:

Statement-I : Mixing the solution of freshly prepared diazonium salt with cuprous chloride or cuprous bromide results in the replacement of the diazonium group by –Cl or –Br.

Statement-II : Replacement of the dizonium group by iodine does not require the presence of cuprous halide and is done simply shaking the diazonium salt with potassium iodide.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Statement-I is correct but Statement-II is incorrect.

(2) Both Statement-I and II are incorrect

(3) statement-I is incorrect but Statement-II is correct.

(4) Both statements-I and II are correct.

75. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)**.

Assertion : Alkyl chlorides are best prepared from alcohols by reaction of $SOCl_2$.

Reason : The other two products are easily escapable. So reaction gives pure Alkyl chlorides.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Both (A) and (R) are correct and (R) is the correct explanation of (A).

(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A).

(3) (A) is correct but (R) is not correct.

(4) (A) is not correct but (R) is correct.

76. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)**.

Assertion : Boiling points of chlorides, bromides and iodides are considerably higher than those of the parent hydrocarbons.

Reason : Due to greater polarity as well as higher molecular mass as compared to parent hydrocarbon, the intermolecular forces of attraction are stronger in halogen derivatives.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Both (A) and (R) are correct and (R) is the correct explanation of (A).

(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A).

(3) (A) is correct but (R) is not correct.

(4) (A) is not correct but (R) is correct.

77. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)**.

Assertion : For the same alkyl group, the boiling point of alkyl halides decrease in the order R–I > R–Br > R–Cl > R–F.

Reason : This is because with the decrease in size and mass of halogen atom, the magnitude of van der waal forces increases.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Both (A) and (R) are correct and (R) is the correct explanation of (A).

(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A).

(3) (A) is correct but (R) is not correct.

(4) (A) is not correct but (R) is correct.

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78. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)**.

Assertion : Chlorobenzene does not react with NaOH where as ethyl chloride reacts.

Reason : The partial double bond between carbon and chlorine in chlorobenzene causes less reactivity towards Nucleophilic substitution reactions.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Both (A) and (R) are correct and (R) is the correct explanation of (A).

(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A).

(3) (A) is correct but (R) is not correct.

(4) (A) is not correct but (R) is correct.

EXERCISE-III (Analytical Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	1	2	2	3	4	2	3	4	4	3	2	1	2	1	4
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	4	1	2	1	2	4	4	3	3	2	2	4	2	2	4
Question	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Answer	2	2	4	3	3	4	1	4	1	3	3	3	1	1	2
Question	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Answer	3	3	3	3	4	3	2	1	2	4	3	1	3	1	4
Question	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Answer	2	2	2	4	4	3	2	3	3	1	2	4	4	4	1
Question	76	77	78												
Answer	1	3	1												

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